

an exhaust pump connected with the process chamber and upstream of the hot trap and having an output operatively connected to the hot trap gas input port to provide gaseous input to the hot trap, whereby a high pressure is created at the hot trap gas input port.

3. (Previously presented) A high pressure chemical vapor trapping system as in claim 1 further comprising:

a second cold trap having a second cold trap gas input port operatively connected to the first cold trap gas output port, a second cold trap gas output port, a second cold trap waste collection surface, and a second cold trap cooler to cool the second cold trap to a third temperature, lower than the second temperature, the second cold trap accepting chemical vapor exhaust at the second cold trap gas input port to further a chemical reaction, and providing non-gaseous wastes at the second cold trap waste collection surface, and providing gaseous exhaust at the second cold trap gas output port, whereby vapor by-products are collected in three stages.

4. (Previously presented) A high pressure chemical vapor trapping system as in claim 1 in which the hot trap first temperature is in the range from 100°C to 500°C.

5. (Previously presented) A high pressure chemical vapor trapping system as in claim 1 in which the first cold trap second temperature is in the range from 25°C to -200°C.

6. (Previously presented) A high pressure chemical vapor trapping system as in claim 1 wherein the chemical vapor exhaust is a MOCVD precursor exhaust, in which the hot trap includes a plurality of collection surfaces extending into the hot trap, the plurality of collection surfaces being heated to the first temperature, and in which the plurality of collection surfaces are reclaimed when a predetermined amount of a solid metal waste is collected on the plurality of collection surfaces from the chemical vapor exhaust.

7. (Previously presented) A high pressure chemical vapor trapping system as in claim 1 further comprising a first valve at the hot trap gas input port, and a second valve at the hot trap gas output port, whereby the first and second valves in the hot trap prevent exhaust from escaping from the hot trap when the hot trap is disconnected.
8. (Previously presented) A high pressure chemical vapor trapping system as in claim 1 further comprising a third valve at the first cold trap gas input port, and a fourth valve at the first cold trap gas output port, whereby the third and fourth valves in the first cold trap prevent exhaust from escaping from the first cold trap when the first cold trap is disconnected.
9. (Previously presented) A high pressure chemical vapor trapping system as in claim 3 further comprising a fifth valve at the second cold trap gas input port, and a sixth valve at the second cold trap gas output port, whereby the fifth and sixth valves in the second cold trap prevent the chemical vapor exhaust from escaping from the second cold trap when the second cold trap is disconnected.
10. (Previously presented) A high pressure chemical vapor trapping system as in claim 1 wherein the chemical vapor exhaust is a MOCVD precursor, in which said hot trap plurality of collection surfaces is biased with a voltage, whereby charged metal from the MOCVD precursor is attracted to and deposited on the plurality of collection surfaces.
11. (Previously presented) A high pressure chemical vapor trapping system as in claim 10 wherein the bias voltage is in the range from -10 to -1000 volts DC, whereby the charged metal from the MOCVD precursor is positively charged and is attracted to and deposited on the plurality of collection surfaces.
12. (Previously presented) A high pressure chemical vapor trapping system as in claim 10 wherein the bias voltage is in the range from 10 to 100 volts DC, whereby the charged metal from the MOCVD precursor is negatively charged and is attracted to and deposited on the plurality of collection surfaces.

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the applications:

Listing of Claims:

1. (Previously presented) A high pressure chemical vapor trapping system to separate and collect elements of a chemical vapor exhaust comprising:

a hot trap positioned downstream of an exhaust pump, which exhaust pump is positioned directly downstream from a substrate processing chamber, the hot trap having a hot trap gas input port, a hot trap gas output port, a hot trap waste collection surface, and a heater to heat the hot trap to a first temperature, the hot trap adapted to accept chemical vapor exhaust at the hot trap gas input port at a trapping pressure to further a chemical reaction, and to provide non-gaseous wastes at the hot trap waste collection surface, and to provide gaseous exhaust at the hot trap gas output port; and

a first cold trap positioned downstream from the hot trap, the first cold trap having a first cold trap gas input port operatively connected to the hot trap gas output port, a first cold trap gas output port, a first cold trap waste collection surface, and a first cold trap cooler to cool the first cold trap to a second temperature, said second temperature being lower than the first temperature, the first cold trap adapted to accept chemical vapor exhaust at the first cold trap gas input port to further the chemical reaction, and to provide non-gaseous wastes at the first cold trap waste collection surface, and gaseous exhaust at the first cold trap gas output port, whereby vapor by-products are collected in two stages.

2. (Previously presented) A high pressure chemical vapor trapping system as in claim 1 further comprising:

19. (Previously presented) The high pressure chemical vapor trapping system as in claim 18 wherein the second cold trap is colder than the first cold trap.
20. (Previously presented) The high pressure chemical vapor trapping system as in claim 15 further comprising a plurality of waste collection surfaces contained within the hot trap and the first cold trap.
21. (Previously presented) The high pressure chemical vapor trapping system as in claim 18 further comprising a plurality of waste collection surfaces contained within the hot trap, the first cold trap, and the second cold trap.
22. (Previously presented) The high pressure chemical vapor trapping system as in claim 15 wherein the temperature in the hot trap ranges from 100°C -500°C.
23. (Previously presented) The high pressure chemical vapor trapping system as in claim 15 wherein the processing chamber, the vacuum pump, the hot trap, and the first cold trap can be isolated from each other with input valves and output valves, wherein the input valves and the output valves control the flow of the chemical vapor exhaust through the chemical vapor trapping system.
24. (Previously presented) The high pressure chemical vapor trapping system as in claim 18 wherein the processing chamber, the vacuum pump, the hot trap, the first cold trap, and the second cold trap can be isolated from each other with input valves and output valves, wherein the input valves and the output valves control the flow of the chemical vapor exhaust through the chemical vapor trapping system.
25. (Previously presented) A high pressure chemical vapor trapping system to separate and collect elements of a chemical vapor exhaust comprising:

a hot trap positioned downstream of an exhaust pump, which exhaust pump is positioned downstream from a substrate processing chamber, the hot trap having a hot trap input port, a hot trap gas output port, a hot trap waste collection surface, and a heater to heat the hot trap to a first temperature, the hot trap adapted to accept chemical vapor exhaust at the hot trap input port

13. (Previously presented) A high pressure chemical vapor trapping system as in claim 1 in which the hot trap includes a second input port to accept a catalyst to further the chemical reaction in the hot trap, the catalyst selected from the group consisting of oxygen, water, alcohol, and ammonia.
14. (Cancelled)
15. (Previously presented) A high pressure chemical vapor trapping system to separate and collect elements of a chemical vapor exhaust, the chemical vapor trapping system comprising:
- a processing chamber;
 - a vacuum pump operatively connected to, and downstream of the processing chamber;
 - a hot trap operatively connected to and positioned downstream of the vacuum pump; and
 - a first cold trap operatively connected with and positioned downstream of the hot trap, wherein the chemical vapor exhaust passes sequentially from the processing chamber to the vacuum pump and to the hot trap, and then to the first cold trap, wherein a non-gaseous chemical waste is separately collected in the hot trap and in the first cold trap, and a gaseous exhaust is thereafter vented.
16. (Previously presented) The high pressure chemical vapor trapping system as in claim 15 wherein the vacuum pump is a dry vacuum pump.
17. (Previously presented) The high pressure chemical vapor trapping system as in claim 15 wherein the vacuum pump is a wet vacuum pump.
18. (Previously presented) The high pressure chemical vapor trapping system as in claim 15 further comprising a second cold trap operatively connected with and positioned downstream of the first cold trap, the second cold trap intended for collecting any additional non-gaseous waste before the gaseous exhaust is vented.

- at a trapping pressure to further a chemical reaction, and to provide non-gaseous wastes at the hot trap waste collection surface, and to provide gaseous exhaust at the hot trap gas output port;
- a first valve at the hot trap gas input port, and a second valve at the hot trap gas output port, whereby the first and second valves in the hot trap prevent exhaust from escaping from the hot trap when the hot trap is disconnected;
- an exhaust pump upstream of the hot trap and having an output operatively connected to the hot trap gas input port to provide gaseous input to the hot trap, whereby a high pressure is created at the hot trap gas input port;
- a first cold trap positioned downstream from the hot trap, the first cold trap having a first cold trap gas input port operatively connected to the hot trap gas output port, a first cold trap gas output port, a first cold trap waste collection surface, and a first cold trap cooler to cool the first cold trap to a second temperature, said second temperature being lower than the first temperature, the first cold trap adapted to accept chemical vapor exhaust at the first cold trap gas input port to further the chemical reaction, and to provide non-gaseous wastes at the first cold trap waste collection surface, and gaseous exhaust at the first cold trap gas output port, whereby vapor by-products are collected in two stages; and
- a second cold trap having a second cold trap gas input port operatively connected to the first cold trap gas output port, a second cold trap gas output port, a second cold trap waste collection surface, and a second cold trap cooler to cool the second cold trap to a third temperature, lower than the second temperature, the second cold trap accepting chemical vapor exhaust at the second cold trap gas input port to further a chemical reaction, and providing non-gaseous wastes at the second cold trap waste collection surface, and providing gaseous exhaust at the second cold trap gas output port, whereby vapor by-products are collected in three stages.

26. (Previously presented) A high pressure chemical vapor trapping system to separate and collect elements of a chemical vapor exhaust comprising:

a hot trap positioned downstream of an exhaust pump, which exhaust pump is positioned downstream from a substrate processing chamber, the hot trap having a hot trap gas input port, a hot trap gas output port, a hot trap waste collection surface, and a heater to heat the hot trap to a first temperature, the hot trap adapted to accept chemical vapor exhaust at the hot trap gas input port at a trapping pressure to further a chemical reaction, and to provide non-gaseous wastes at the hot trap waste collection surface, and to provide gaseous exhaust at the hot trap gas output port;

an exhaust pump upstream of the hot trap and having an output operatively connected to the hot trap gas input port to provide gaseous input to the hot trap, whereby a high pressure is created at the hot trap gas input port;

a first cold trap positioned downstream from the hot trap, the first cold trap having a first cold trap gas input port operatively connected to the hot trap gas output port, a first cold trap gas output port, a first cold trap waste collection surface, and a first cold trap cooler to cool the first cold trap to a second temperature, said second temperature being lower than the first temperature, the first cold trap adapted to accept chemical vapor exhaust at the first cold trap gas input port to further the chemical reaction, and to provide non-gaseous wastes at the first cold trap waste collection surface, and gaseous exhaust at the first cold trap gas output port, whereby vapor by-products are collected in two stages;

a third valve at the first cold trap gas input port, and a fourth valve at the first cold trap gas output port, whereby the third and fourth valves in the first cold trap prevent exhaust from escaping from the first cold trap when the first cold trap is disconnected;

a second cold trap having a second cold trap gas input port operatively connected to the first cold trap gas output port, a second cold trap gas output port, a second cold trap waste collection surface, and a second cold trap cooler to cool the second cold trap to a third temperature, lower than the second temperature, the second cold trap accepting chemical vapor exhaust at the second cold trap gas input port to further a chemical reaction, and providing non-gaseous wastes at the second cold trap waste collection surface, and providing gaseous exhaust at the second cold trap gas output port, whereby vapor by-products are collected in three stages; and

a fifth valve at the second cold trap gas input port, and a sixth valve at the second cold trap gas output port, whereby the fifth and sixth valves in the second cold trap prevent the chemical vapor exhaust from escaping from the second cold trap when the second cold trap is disconnected.

27. (Previously presented) A high pressure chemical vapor trapping system to separate and collect elements of a chemical vapor exhaust, the chemical vapor trapping system comprising:

a processing chamber;

a dry vacuum pump operatively connected to, and downstream of the processing chamber;

a hot trap operatively connected to and positioned downstream of the vacuum pump;

a first cold trap operatively connected with and positioned downstream of the hot trap, wherein the chemical vapor exhaust passes sequentially from the processing chamber to the vacuum pump and to the hot trap, and then to the first cold trap, wherein a non-gaseous chemical waste is separately collected in the hot trap and in the first cold trap, and a gaseous exhaust is thereafter vented; and

a second cold trap operatively connected with and positioned downstream of the first cold trap, the second cold trap intended for collecting any additional non-gaseous waste before the gaseous exhaust is vented.

28. (Previously presented) A high pressure chemical vapor trapping system to separate and collect elements of a chemical vapor exhaust, the chemical vapor trapping system comprising:

a processing chamber;

a wet vacuum pump operatively connected to, and downstream of the processing chamber;

a hot trap operatively connected to and positioned downstream of the vacuum pump, wherein the temperature in the hot trap ranges from 100°C -500°C;

a first cold trap operatively connected with and positioned downstream of the hot trap, wherein the chemical vapor exhaust passes sequentially from the processing chamber to the vacuum pump and to the hot trap, and then to the first cold trap, wherein a non-gaseous chemical waste is separately collected in the hot trap and in the first cold trap, and a gaseous exhaust is thereafter vented; and

a second cold trap operatively connected with and positioned downstream of the first cold trap, the second cold trap intended for collecting any additional non-gaseous waste before the gaseous exhaust is vented.

29. (Previously presented) A high pressure chemical vapor trapping system to separate and collect elements of a chemical vapor exhaust, the chemical vapor trapping system comprising:

a processing chamber;

a vacuum pump operatively connected to, and downstream of the processing chamber;

a hot trap having a plurality of waste collection surfaces in an interior of the hot trap, the hot trap operatively connected to and positioned downstream of the vacuum pump;

a first cold trap having a plurality of waste collection surfaces in an interior of the first cold trap, the first cold trap operatively connected with and positioned downstream of the hot trap, wherein the chemical vapor exhaust passes sequentially from the processing chamber to the vacuum pump and to the hot trap, and then to the first cold trap, wherein a non-gaseous chemical waste is separately collected in the hot trap and in the first cold trap, and a gaseous exhaust is thereafter vented; and

a second cold trap having a plurality of waste collection surfaces in an interior of the second cold trap, the second cold trap operatively connected with and positioned downstream of the first cold trap, the second cold trap intended for collecting any additional non-gaseous waste before the gaseous exhaust is vented, wherein the second cold trap is at a lower temperature than the first cold trap.

30. (Previously presented) A high pressure chemical vapor trapping system to separate and collect elements of a chemical vapor exhaust, the chemical vapor trapping system comprising:

a processing chamber;

a vacuum pump operatively connected to, and downstream of the processing chamber;

a hot trap having a plurality of waste collection surfaces in an interior of the hot trap, the hot trap operatively connected to and positioned downstream of the vacuum pump;

a first cold trap having a plurality of waste collection surfaces in an interior of the first cold trap, the first cold trap operatively connected with and

positioned downstream of the hot trap, wherein the chemical vapor exhaust passes sequentially from the processing chamber to the vacuum pump and to the hot trap, and then to the first cold trap, wherein a non-gaseous chemical waste is separately collected in the hot trap and in the first cold trap, and a gaseous exhaust is thereafter vented; and

a second cold trap having a plurality of waste collection surfaces in an interior of the second cold trap, the second cold trap operatively connected with and positioned downstream of the first cold trap, the second cold trap being colder than the first cold trap and intended for collecting any additional non-gaseous waste before the gaseous exhaust is vented, and wherein the processing chamber, the vacuum pump, the hot trap, the first cold trap, and the second cold trap can be isolated from each other with input valves and output valves, wherein the input valves and the output valves control the flow of the chemical vapor exhaust through the chemical vapor trapping system.

31. (Previously presented) A high pressure chemical vapor trapping system to separate and collect elements of a chemical vapor exhaust comprising:

a process chamber;

a vacuum pump operatively connected with the process chamber, downstream of said process chamber;

a hot trap operatively connected with the vacuum pump and downstream of said vacuum pump;

a first cold trap operatively connected with the hot trap and downstream of said hot trap; and

a second cold trap operatively connected with the first cold trap and downstream of said first cold trap.

32. (Previously presented) A high pressure chemical vapor trapping system to separate and collect elements of a chemical vapor exhaust comprising:

a vacuum pump;

a hot trap operatively connected with the vacuum pump and downstream of said vacuum pump;

a first cold trap operatively connected with the hot trap and downstream of said hot trap; and

a second cold trap operatively connected with the first cold trap and downstream of said first cold trap.

33. (Canceled)

34. (Canceled)